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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/782,731	02/18/2004	Junichi Nakai	60893 (70840)	3390
21874 7590 02/13/2007 EDWARDS & ANGELL, LLP P.O. BOX 55874 BOSTON, MA 02205			EXAMINER RICHARDS, N DREW	
			ART UNIT	PAPER NUMBER
			2815	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		02/13/2007	PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/782,731

Applicant(s)

NAKAI, JUNICHI

Examiner

N. Drew Richards

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 November 2006.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 and 15-18 is/are pending in the application.
- 4a) Of the above claim(s) 16-18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 and 15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 September 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is in response to applicant's amendment and arguments filed 11/17/2006.

Election/Restrictions

2. Applicant's election without traverse of Group I in the reply filed on 3/7/05 is acknowledged. Claims 1-11 along with linking claims 12-15 are examined herein.

Claim Objections

3. Claims 1-13 and 15 objected to because of the following informalities: the term "alligned" in these claims should be spelled "aligned." Appropriate correction is required.
4. Claims 4 and 11 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. These claims recite the limitation of the optical axis being aligned with the central axis of the opening region. However, this limitation is now included in claim 1 and therefore repeating this limitation in claims 4 and 11 does not further limit the previous claim.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

6. Claims 1-6, 8-13 and 15 are rejected under 35 U.S.C. 102(a) as being anticipated by applicant's admitted prior art (APA) figures 4 and 5A-5E.

Applicant's admitted prior art discloses in figure 4 a semiconductor apparatus comprising:

- a light input/output portion 102 provided in an upper portion of a semiconductor substrate 101, the light input/output portion 102 having an opening region 109x for light associated to the light input/output portion 102 to pass through, the opening region having a central axis B-B' and being bounded by a light shielding layer 109;
- a transparent film 110 covering the opening region; and
- an interlayer lens 111a provided on the transparent film 110, the interlayer lens 111a positioned such that an optical axis C-C' of the interlayer lens 111a is aligned with the central axis of the opening region (the optical axis is "aligned" as it is defined by upper point C, which is formed aligned with the central axis, and lower point C', axis C-C' is thus aligned as one of the two points defining the axis is aligned with the central axis);

- wherein the light shielding layer 109 is asymmetric with respect to the central axis B-B' of the opening region, as viewed from a cross-section of the semiconductor apparatus, the central axis being perpendicular to the surface of the semiconductor substrate 101.

With regard to claim 2, the light input/output portion 102 includes a light receiving portion for receiving light.

With regard to claim 3, the transparent film 110 is provided with step portions so as to have a concaved surface, and the concaved portion covers the opening region (transparent film 110 has step portions along the surface of layer 109 such that it has a concave portion covering the opening region).

With regard to claim 4, the optical axis of the interlayer lens 111a is aligned with the central axis of the opening region.

With regard to claim 5, a refractive index of the transparent film is lower than a refractive index of the interlayer lens.

With regard to claim 6, the transparent film includes a silicon oxide film including at least one of phosphorous and boron (disclosed as being BPSG).

With regard to claims 8 and 9, the limitations in these claims are product-by-process limitations. In these claims, the processes claimed do not result in any structural difference over the prior art and thus the structure claimed is anticipated.

With regard to claim 10, APA further discloses a transfer channel 104 provided so as to have a predetermined space from the light input-output portion, an insulating

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film 106 provided on the substrate, the light input/output portion and the transfer channel, a transfer electrode 107 provided so as to oppose the transfer channel via the insulating film, and an insulating film 108 provided with an opening for exposing the opening region of the light input/output portion and in which the step portions are produced by covering the transfer electrode.

With regard to claim 11, the optical axis of the interlayer lens is aligned with the central axis of the opening.

With regard to claim 12, APA disclose in figures 5A-5E a method comprising:

- forming a light input/output portion 102 provided in an upper portion of a semiconductor substrate 101, the light input/output portion 102 having an opening region 102x for light associated to the light input/output portion 102 to pass through, the opening region having a central axis B-B';
- forming a light shielding layer 109 with an opening 109x for exposing the opening region 102x of the light input/output portion;
- forming a transparent film 110 covering the opening region; and
- forming an interlayer lens 111a provided on the transparent film 110, the interlayer lens 111a positioned such that an optical axis C-C' of the interlayer lens 111a is aligned with the central axis B-B' of the opening region (the optical axis is "aligned" as it is defined by upper point C, which is formed aligned with the central axis, and lower point C', axis C-C' is thus aligned as one of the two points defining the axis is aligned with the central axis);

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- wherein the light shielding layer 109 is asymmetric with respect to the central axis B-B' of the opening region, as viewed from a cross-section of the semiconductor apparatus, the central axis being perpendicular to the surface of the semiconductor substrate 101.

With regard to claim 13, forming the light input/output portion includes forming a light receiving portion for receiving light.

With regard to claim 15, the optical axis of the interlayer lens is formed aligned with the central axis of the opening.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art as applied to claims 1-6 and 8-13 and 15 above, and further in view of JP 4-111354.

APA fails to teach the transparent film including an organic high polymer film.

JP 4-111354 teach the use of an organic high-polymer film in a solid-state image pickup device. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the organic high-polymer film as the transparent film in order to

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take employ the film as a surface protective layer. Thus, it would have been obvious to combine these references to obtain the invention of claim 7.

Response to Arguments

9. Applicant's arguments filed 11/17/06 have been fully considered but they are not persuasive.

Applicant's arguments with regard to JP 4-111354 have been considered, but are moot in view of the new grounds of rejection presented above.

Applicant does briefly address the admitted prior art figure 4. Applicant argues the APA figure 4 depicts a device where the optical axis of the interlayer lens is not provided parallel to a central axis of the opening. This is not persuasive since the claims as currently presented do not require the optical axis and central axis be parallel, but merely to be "aligned."

Further, it is noted that the term "aligned" does not necessitate a parallel alignment, or that the axes be coextensive. Rather "aligned" is broad enough to encompass one axis that is merely formed using the other axis, or formed to a certain offset from the other axis, or formed at a certain angle from the other axis.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to N. Drew Richards whose telephone number is (571) 272-1736. The examiner can normally be reached on Monday-Friday 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Parker can be reached on (571) 272-2298. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



N. DREW RICHARDS
PRIMARY EXAMINER